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EDUCATION:

4/83 - 12/88	**Stanford University**, Ph. D. in Physics. Thesis: "Observation and Analysis of X-Ray Undulator Radiation from PEP" Thesis Advisor: Dr. George S. Brown
6/80 - 4/82	**Stanford University**, M. S. in Physics.
8/76 - 5/80	**Rice University**, B. A. in Physics.

EXPERIENCE:

1/95 - present **Beamline Control and Data Acquisition Systems**,
Illinois Institute of Technology, Chicago, IL

Responsible for beamline controls and data acquisition on four protein crystallography beamlines (IMCA-CAT and SER-CAT) and one materials science beamline (MR-CAT) at the Advanced Photon Source. Specified, purchased, tested and installed motion control and data acquisition equipment for the beamlines. Worked with beamline users to determine their needs for data acquisition and control. Learned how to install and configure EPICS, which is a VME-based control system that runs on top of the VxWorks real time operating system using Sparcstations as development hosts. Wrote application programs that interface with EPICS servers via Channel Access. Installed and tested VME motor controllers and counter/timers operated via EPICS. Installed the commercial X-ray diffraction program named *spec* for use with the 8-circle diffractometer at MR-CAT. Participated in the commissioning of the IMCA-CAT and MR-CAT beamlines and now share responsibility for user support on those beamlines. Currently continuing to refine and upgrade the control software and hardware for the beamlines.

Created a new portable data acquisition and control toolkit called MX which is designed to allow the writing of beamline control programs that can easily be moved between control systems on different beamlines and even different storage rings. Expanded MX into a distributed client/server system using TCP/IP sockets and ANSI C that can run stand-alone or in cooperation with other control systems such as EPICS. Ported MX so that it can be used on Linux, Irix, Solaris, HP-UX, MacOS X, and Microsoft Windows platforms. Wrote over 200 MX device drivers to control motors, scalers, timers, ADCs, DACs, digital I/O ports, MCAs, MCSs and other devices. These devices are accessed via RS-232, GPIB, VME, CAMAC, PC bus cards, Windows DLLs or network protocols such as EPICS Channel Access. Also wrote 21 pseudomotor drivers for MX that allow beamline users to move and scan quantities such as monochromator X-ray energy or XAFS electron wavenumber (k) as if they were real motors. Created quick scan software that avoids the time overhead of motor step scans by recording the data in multichannel scalers. Developed MX interfaces to the new high throughput X-Ray Instrumentation Associates DXP multichannel analyzer systems. Created Python and Tcl/Tk interfaces to the MX library which have been used for the development of GUI beamline user interfaces that run on both the Unix and the Microsoft Windows platforms. Also wrote a command line based program for controlling MX containing a scripting capability that allows the user to run a sequence of scans unattended.

Helped specify PLC-based equipment protection systems. Responsible for system administration and web server management of several computers at the APS and at IIT.

1/91 - 12/94 **Synchrotron Radiation-Based Medical Imaging**,
Stanford University, Stanford, CA

Participated in Stanford's coronary angiography program which performed experiments at the NSLS X-ray storage ring. Developed a new monochromator system for use in angiography. Defined and developed the data acquisition and control system for a new 1200 channel Si(Li) detector and its associated motors, shutters and interfaces. Characterized the new detector and its electronics. Compared signal-to-noise ratio and image quality of the new system with the previous detector system. Improved image analysis techniques. Participated in 14 patient runs. Operated and upgraded the data acquisition system during patient and instrumentation development runs.

2/90 - 5/92 **Storage Ring Control Systems**,
Stanford Synchrotron Radiation Laboratory, Stanford, CA

Development and installation of a CAMAC based control system for the new injector ring for SPEAR. Developed the control system interface for the injector ring's beam position monitoring system and made upgrades to the control system for the SPEAR storage ring.

6/89 - 2/90 **Radar Pattern Recognition**,
MIT Lincoln Laboratory, Lexington, MA

Developed and tested algorithms for pattern recognition in synthetic aperture radar data.

1/87 - 5/89 **X-Ray Undulator Radiation**,
Stanford Synchrotron Radiation Laboratory, Stanford, CA

Performed experiments to estimate metal strain in beamline components due to synchrotron light. Measured the energy spectra and both spatial and angular distributions of synchrotron light from the PEP-1B undulator magnet on the PEP storage ring. Wrote a set of computer programs to calculate the theoretical X-ray flux from undulator magnets. Applied corrections for absorption and monochromator crystal effects to the theoretical undulator spectra and compared them to experimental data from PEP and SPEAR. Performed X-ray beamline support duties for the winter 1989 run at SPEAR.

4/84 - 12/86 **Nuclear Resonant Scattering**,
Stanford Synchrotron Radiation Laboratory, Stanford, CA

Built and characterized a small ion beam source. Constructed thin films of Fe-Si using magnetron sputtering. Developed requirements for liquid phase epitaxial deposition of films of Yttrium Iron Garnet enriched in the nuclear resonant Fe^{57} nucleus. Measured the characteristics and perfection of crystal samples using double-crystal X-ray diffraction apparatus. Upgraded a CAMAC based data acquisition system to handle extra degrees of freedom for the nuclear resonant scattering work. Participated in synchrotron radiation experiments at Stanford Synchrotron Radiation Laboratory searching for evidence of nuclear resonant Bragg diffraction.